Bear River Bottoms Wetlands
Annual Wetland Monitoring Site Report
2000-2001

I. Introduction

This is a report of volunteer wetland monitoring activity at the Bear River Bottoms wetlands for the years 2000 and 2001. The area was first monitored in the fall of 2000, but no annual report was written for that year. Those data are included in this report.

A. Site Description

Bear River Bottoms is located just west of where Highway 142 crosses the Bear River in the northern Cache Valley. The wetland is an old oxbow of the Bear River, and is fed primarily from snowmelt and groundwater. There also appears to be a seep draining the hillside on the west side of the wetland. Pacificorp owns the site, but it is leased by the Division of Wildlife Resources and Pheasants Forever, who manage the area for wildlife habitat. The wetland is approximately 13 acres in size.

B. Monitoring Group Description

Bear River Bottoms is monitored by Logan High School students. Some students are in environmental science classes; others are members of the Logan Environmental Action Force (LEAF). Before monitoring, the students have had 1-3 hours of classroom and field training in monitoring protocol. Usually, groups of 5 to 10 students visit the site at one time, accompanied by their teacher and the Division wetland monitoring coordinator and wetland specialist.

C. Dates Monitored

Monitoring occurred at Bear River Bottoms in the fall of 2000, the spring of 2001, and the fall of 2001. No summer or winter monitoring occurred at this site.

II. Data

A. Water Quality

Water quality parameters have been measured at Bear River Bottoms a total of seven times. Results are listed in the table below. Water quality results are compared to the State of Utah's Water Quality Standards for Aquatic Wildlife, Class 3C. Waters in the 3C class are "Protected for non-game fish and other aquatic life, including the necessary aquatic organisms in their food chain." Individual parameters are discussed below.

Parameter	units	Fall 2000 Oct 16	Oct 23	Nov 1	Spring 2001 Apr 24	May 30
pH		9	9	9	8	7.5
Phosphorus	mg/l	0	<1	0	0.06	0.6
Nitrate	mg/l	na	<1	1	1	0
Diss. Oxygen	mg/l	12	12	10	10	9
Turbidity	cm	7	6	8	18	60
Turbidity	NTUs	240	>240	240	50	8
Rain in last 72 hrs	inches	0.6	0.13	0.29	0.17	0

		Fall 2001, October 23 Ground	Seep	UT Aquatic Wildlife Standards 3C
pH		7	7.5	6.5-9.0
Phosphorus	mg/l	0.1	0	no standard
Nitrate	mg/l	5.0	1.0	4.0
Diss. Oxygen	mg/l	7	11	3.0
Turbidity	cm	too little water to		
Turbidity	NTUs	measure turbidity		increase of 15
Rain in last 72 hrs	inches	trace	trace	
Water Temperature	Celsius	7.7	7.5	27

pH: pH is a measurement of how acidic or how basic the water is. For fish and most macroinvertebrates, optimum pH is between 6.5 and 9.0. All pH measurements at Bear River Bottoms fell within this optimum range.

Phosphorus: Phosphorus is an important plant nutrient; however, too much phosphorus in a water body can cause excess plant growth in the water. Utah does not have a phosphorus standard for 3C waters, but in other waters the standard maximum level is 0.05 mg/l. Phosphorus measurements at Bear River Bottoms fell between 0 and 0.6 mg/l, with one measurement of <1.

Nitrates: Nitrate, a form of nitrogen, is another important plant nutrient. Like phosphorus, too much nitrate can result in excess plant growth. Utah's class 3C maximum standard for nitrate is 4 mg/l. In October of 2001, a measurement of 5.0 mg/l was made in the groundwater at Bear River Bottoms. On that day, the water level was extremely low; in fact the groundwater collectd for the water quality test was found in large cracks in the mud. A sample collected in a seep-fed area about 25 yards away yielded a test result of 1.0 mg/l.

Dissolved Oxygen: Dissolved oxygen, or DO, is important to the fish and macroinvertebrates that live in the water. DO levels in water fluctuate with elevation, water temperature and salinity as well as diurnal changes in plant photosynthesis and respiration. For class 3C waters, the Utah 1-day minimum standard is 3.0 mg/l. All DO measurements at Bear River Bottoms met this standard.

Turbidity: Turbidity is a measurement of the solids suspended in the water. Less suspended solids mean that light can penetrate farther into the water, producing a lower measurement of turbidity. The Utah class 3C standard for turbidity is a change of no more than 15 NTUs from the established natural level of turbidity for the particular water body; however, no natural level of turbidity has been established for Bear River Bottoms. The turbidity measurements at Bear

River Bottoms have ranged from a low of 8 NTUs (in late spring) to a high of >240 NTUs. The high readings occurred in the fall of 2000, when water levels were fairly low, and carp were present in the water. Likely, the carp contributed to the turbidity in two ways: by stirring up the sediments in the shallow water, and by consuming macrophytes growing in the water. With fewer macrophytes surrounding the water, the wind would have a greater effect blowing across the open water, causing more mixing of water and sediments. In the fall of 2001, the water was too low to measure turbidity, and the carp were no longer present (presumably due to the low water).

Water Temperature: Water temperature is monitored because it greatly affects fish and macroinvertebrates. The Utah class 3C maximum water temperature standard is 27 degrees Celsius. All water temperature measurements at Bear River Bottoms (begun in the summer of 2001) have been below the maximum standard.

B. Macroinvertebrates

Macroinvertebrate samples have been collected at Benson Bridge 4 times since monitoring began. The samples are at the USU Bug Lab where they will be sorted and identified to the lowest possible taxonomic group. Organisms found frequently at this site (some variation with season) include Amphipoda (scuds), Culicidae (mosquitoes), Chironomidae (midges), Coleoptera (beetle larvae), Odonata (damselflies), Hempitera (water boatmen), and Cladocera (daphnia/water fleas).

C. Birds

Birds have been monitored at Bear River Bottoms a total of five times. The table below lists each bird seen on each monitoring date.

Common Name	Oct 16, 2000	Oct 23, 2000	Nov 1, 2000	Apr 24, 2001	Oct 23, 2001
American Bittern				1	
American Goldfinch	x	x		3	
American Robin	x	x	x	10	9
Black-billed Magpie	x	x	x		
Black-capped Chickadee		x	x		
California Gull					1
Cedar Waxwing	x	x	x		1
Cliff Swallow				3	
Dark-eyed Junco	x	x			3
Downy Woodpecker		x			
Franklin's Gull				12	
Great Blue Heron				1	
Great Horned Owl				2	
Green-winged Teal				32	
Mallard		x			
Northern Flicker	x	x			
Oriole				2	
Red-tailed Hawk	x				
Red-winged Blackbird	x			4	

Ring-necked Pheasant	x				2
Rough-legged Hawk			x		
Ruby-crowned Kinglet					1
Sandhill Crane		x			
Song Sparrow	x	x		2	1
Starling	x	x		2	
Swallow				3	
Unknown Finch					1
Vesper Sparrow				1	
Western Meadowlark				1	
White Pelican				1	
White-crowned Sparrow	x	x	x		1
Yellow-rumped Warbler				3	
Total species observed:	12	13	6	17	9

x = number of individuals seen unknown

The most commonly seen bird at Bear River Bottoms (seen each time it was monitored), is the American Robin. Species seen four out of five times are Cedar Waxwing, Song Sparrow, and White-Crowned Sparrow. Species seen three out of five times are American Goldfinch, Black-billed Magpie, Dark-eyed Junco, and European Starling. No birds seen are listed as Uncommon or Rare on the Field Checklist of the Birds of Utah.

D. Wildlife

The wildlife protocol was begun in the spring of 2001, and has been carried out twice at Bear River Bottoms. The table below lists the species observed and the evidence by which they were observed.

	Method of Observation	
Common name	**24-Apr-01**	**23-Oct-01**
Western chorus frogs	sound	
Domestic cat	scat	
Deer	tracks, sight	scat
Beaver		chewings
Gopher		scat, hole
Raccoon		tracks
Fox		scat

Of the six species observed, the red fox and possibly the raccoon are not native to the Cache Valley. They may present a problem to overall wetland health, as they often prey upon nesting waterfowl.

E. Vegetation

Five vegetation transects have been established at Bear River Bottoms. They have only been monitored in their entirety once, on May 30, 2001. All plants found on all transects are listed in the table below, along with their status as wetland indicator plants.

		May 01	May 01	May 01	May 01	May 01	Indicator
Common Name	**Scientific Name**	**Trans 1**	**Trans 2**	**Trans 3**	**Trans 4**	**Trans 5**	**Status**
Forbs							
Nodding Beggar Tick	Bidens cernua						OBL
Pale Smartweed	Polygonum lapathifolium						OBL
Cattail	Typha latifolia			x	x	x	OBL
Teasel	Dipsacus fullonum			x	x		FACW
Field mint	Mentha arvensis			x			FACW
Broad-leafed Dock	Rumex obtusifolius						FACW
Creeping buttercup	Ranunculus repens				x		FACW-
Bittersweet Nightshade	Solanum dulcamara	x					FAC
Stinging nettle	Urtica dioica	x					FAC
Cocklebur	Xanthium strumarium						FAC
Bull Thistle	Cirsium vulgare					x	FAC
Broadleaf Plantain	Plantago major		x	x	x		FAC
Curly Dock	Rumex crispus		x		x	x	FAC
Canada Thistle	Cirsium arvense	x		x	x	x	FACU
Marsh sowthistle	Sonchus arvensis	x	x		x		FACU
Yellow Sweetclover	Melilotus officinalis	x	x		x	x	FACU
Chicory	Cichorium intybus					x	FACU
Catchweed Bedstraw	Galium aparine	x		x			FACU
Spiny Sowthistle	Sonchus asper				x		FACU
Houndstongue	Cynoglossum officinale			x			FACU
Horseweed	Conyza canadensis	x					FACU
White Horehound	Marrubium vulgare	x					FACU
Dandelion	Taraxacum officinale		x		x		FACU+
Annual sowthistle	Sonchus oleraceus	x					UPL
Marsh marigold	Caltha spp.		x				dep on spp
Thistle	Cirsium spp.			x			dep on spp
Common Burdock	Arctium minus	x					NI
Catchweed	Asperugo procumbens	x					NI
Alfalfa	Medicago sativa			x	x		NI
Hairy fleabane	Conyza bonariensis		x			x	na
Plumeless thistle	Carduus acanthoides		x				na
Meadow knapweed	Centaurea pratensis					x	na
Silverwood cinquefoil	Potentilla anserina				x	x	na
Unknown Buttercup			x	x	x		
Unknown Broadleaf							
Unknown White Flower							
Unknown Nightshade		x					
Unknown Pea					x		
Unknown				x			
Grasses							
Reed Canarygrass	Phalaris arundinacea	x	x	x	x	x	FACW+

Kentucky bluegrass	Poa praetensis			x			FACU
Tall Fescue	Festuca spp.		x				dep on spp
Unknown Grass					x		
Sedges							
Creeping spikerush	Eleocharis palustris		x	x	x	x	OBL
Three Square Rush	Scirpus pungens		x				OBL
Hardstem Bullrush	Scirpus acutus		x	x	x	x	OBL
Carex spp.	Carex spp.			x	x		dep on spp
Trees & Shrubs							
Tamarisk	Tamarix ramosissima		x			x	FACW
Cottonwood	Populus angustifolia					x	FACW*
Coyote willow	Salix exigua	x	x	x	x	x	FACW
Wild rose	Rosa spp.				x		dep on spp
Poplar							dep on spp

OBL = Obligate - 99% or greater of the individuals of a species occur in wetlands
FACW = Facultative Wetland - 66-99% of the individuals of a species occur in wetlands
FAC = Facultative - 33-66% of the individuals of a species occur in wetlands
FACU = Facultative Upland - 1-33% of the individuals of a species occur in wetlands
UPL = Upland - less than 1% of the individuals of a species occur in wetlands
NI = No Indicator
na = No indicator information available on this species
dep on spp = Indicator status is variable, depending on which particular species is present
+ indicates a frequency toward the higher end of the category
- indicates a frequency toward the lower end of the category
* indicates a tentative assignment based on limited information

The most commonly observed plant species at the site are reed canarygrass and coyote willow, which were found on all five transects. Both plants are facultative wetland indicators. The next most common plants were Canada thistle, hardstem bulrush, creeping spikerush, and yellow sweetclover. Of these plants, creeping spikerush and hardstem bulrush are obligate wetland indicators, while Canada thistle and yellow sweetclover are facultative upland indicators.

The only noxious weed found on the site is Canada thistle (State of Utah noxious weed). Although it is not a declared noxious weed, the presence of tamarisk in the area between the oxbow and current bank of the Bear River poses a potential problem. Large concentrations of tamarisk trees can form a monoculture, limiting wildlife diversity, and can dry up ponds and streams through tremendous transpiration rates.

F. Land Use

Land use is recorded for a 200 foot buffer zone around the wetland. The following table displays the observations for fall 2000 and spring 2001. It appears that for the fall 2000 observations, a wider buffer area was assumed (in reality, the paved road does not fall within the 200 foot buffer).

Land Use Category	10/16/00	04/24/01
	Cover Class	Cover Class
Residential	0-5.5%	0-5.5%

Agriculture	26-50%	6-25%
Native Vegetation	96-100%	51-75%
Roads (paved)	0-5.5%	

The land use surrounding Bear River Bottoms appears to be very stable. There is a farmhouse and some agricultural land on a bluff to the southwest of the wetland. The remainder of the wetland is surrounded by upland grasses and trees. This vegetation appears to be a mix of native and non-native species. Since the area is managed by the Division of Wildlife and Pheasants Forever, there may be some management for plant species favorable for pheasant habitat.

G. Hydrology

During the 2000 and 2001 monitoring years, water levels were not measured at Bear River Bottoms; however, the monitoring coordinators observed the water levels without recording them. The water appears to be at its highest in the spring and becomes extremely low in the fall. In the fall of 2001, the only standing water observed was in mud cracks at the bottom of the wetland approximately 10 inches below the mud surface. Some water was draining into the wetland from a seep on the southwest side. In the spring of 2002, a staff/crest gauge was installed to measure actual water levels. The initial reading was 69 centimeters. Two weeks later it read 60 centimeters, a drop of nine centimeters.

III. Conclusions

A. General

Bear River Bottoms seems to be a reasonably healthy functioning wetland. Water quality parameters are mostly within the state standards; however phosphorus measurements exceeded the state standard at least three out of seven times. These must be calibrated through submission of samples to the state water quality laboratory. In addition, turbidity levels were extremely high in the fall of 2000, probably due to the presence of carp. There is a good diversity of bird species at the wetland – wading birds, waterfowl, perching birds, and birds of prey are consistently observed. Vegetation at the wetland includes many obligate and facultative wetland species, and only a low occurrence of weed species (Canada thistle and tamarisk).

B. Recommendations

Continue wetland monitoring at Bear River Bottoms. Verify phosphorus measurements by sending samples to the state water quality laboratory. Also note turbidity, to see if high turbidity occurs again as it did in the fall of 2000. Measure water level in the wetland using the staff/crest gauge.